REMARKS

Claims 1 through 20 are pending in the present application.

The Action rejects claims 1 through 20 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

(a) The claimed term "at least about 99.9 wt % isopropyl alcohol" in claim 1(a) is cited by the Action as being indefinite because there is no indication as to what range of specific activity is covered by the term "about". The term "at least about 99.9 wt % isopropyl alcohol" has been amended to read "at least 99.9 wt % isopropyl alcohol", in claims 1, 10, 11 and 20. Therefore, it is respectfully submitted that this term is definite under 35 U.S.C. §112, second paragraph, and as such, Applicants respectfully request reconsideration and withdrawal of this rejection.

(b) The Action states that claim 1(b) and (c) provide for confusion and inconsistency. The Action states that the feed is fed into a separation column for separation, however, the overhead, bottoms and side stream all contain IPA (which would presuppose that no separation occur at all) such that no difference is seen among the IPA withdrawn at different withdrawal points.

It is respectfully submitted that the process steps of claim 1 are consistent with each other and that the subject matter of the present invention is distinctly claimed. As now recited in claim 1(b), any IPA in the overhead stream and the bottoms stream are not high purity IPA, as that high purity IPA in the vapor side stream, as recited in claim 1 (c) (i) and (ii). As noted in the specification at page 8, lines 7 through 14, the overhead stream and the bottoms stream contain IPA with increased concentrations of components (impurities) having a boiling point less than

IPA with respect to the overhead stream and a boiling point greater than IPA with respect to the bottoms stream. Therefore, it is clear that separation does occur, and the process steps of claim 1 are consistent with each other. Thus, reconsideration and withdrawal of this rejection is respectfully requested.

(c) The Action states that claim 9, as recited, provides for ambiguity. The Action queries what the difference is in wt. % between the overhead and the bottoms stream for separation and what constitutes the bottoms stream within the context of the claimed invention. It is respectfully reiterated that claim 9 clearly recites the wt. % of both the overhead stream and the bottoms stream. As recited, the overhead stream includes about 5 to 30 wt.% of the feed stream and the bottoms stream includes about 5 to 30 wt.% of the feed stream.

As set forth in the specification, in conjunction with Figures 1 and 2, when the feed stream is introduced in the separation column, it is divided into three streams, namely the overhead stream, the bottoms stream, and the vapor sidestream. Of the total weight of the IPA feed stream, about 5 to 30 wt.% exits the separation column via the overhead stream, about 5 to 30 wt.% exits the separation column via the bottoms stream, and the balance, which in the present invention is high purity IPA, is taken from the separation column as a vapor sidestream (page 6, lines 10-15 and Figs. 1 and 2). In addition, both the overhead stream and the bottoms stream is clearly defined in the specification as each having the amount of the feed stream, as set forth above, in addition to having increased concentrations of components having a boiling point less than IPA in the case of the overhead stream and a boiling point greater than IPA in the case of the bottoms stream (page 8, lines 13-14). The IPA in both the overhead stream and the bottoms stream is not high purity IPA, and thus separation clearly occurs in the claimed process. Therefore, it is respectfully submitted that claim 9 is not ambiguous and, to the contrary, distinctly claims the subject matter of the invention.

The Action states that claim 10 provides for confusion because the ternary azeotrope was not specified in the claims. The Action also queries as to what are the overhead and bottoms

stream products of the distilling step. It is respectfully reiterated that the term ternary azeotrope is not only a term that would be reasonably understood by one skilled in the art, it is clearly described in the specification at page 7, lines 20-23. Therefore, claim 10 is definite and distinctly claims the subject matter of the invention. In addition, it is again noted that claim 10 does not recite overhead and bottoms stream products of the distilling step, therefore, there can be no confusion in this regard with claim 10. The distilling process used to produce the at least 99.9 wt.% IPA used as the feed stream in the process of claim 1 is clearly described on page 7 of the present specification.

Claims 1 through 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,788,043 to Kagiyama et al. (Kagiyama) or U.S. Patent 5,585,527 to Marker with or without U.S. Patent 5,868,906 to Adams et al. (Adams).

Claim 1 recites a process for producing high purity isopropyl alcohol comprising the steps of (a) feeding a feed stream comprising at least 99.9 wt.% isopropyl alcohol into a separation column; (b) separating the isopropyl alcohol into an overhead stream taken overhead from the separation column and a bottoms stream taken as bottoms from the separation column wherein any isopropyl alcohol in said overhead stream and said bottoms stream is not high purity isopropyl alcohol; and (c) removing the high purity isopropyl alcohol at a point: (i) below where the feed stream enters the separation column but above the bottoms stream, or (ii) above where the feed stream enters the separation column but below the overhead stream. The high purity isopropyl alcohol has a metals content of less than about 1 ppb and a water content of less than about 100 ppm.

Claim 11 recites a process for producing a high purity isopropyl alcohol comprising the steps of: (a) feeding a feed stream comprising at least 99.9 wt.% isopropyl alcohol into a separation column; and (b) separating the isopropyl alcohol into an overhead stream taken overhead from the separation column and a bottoms stream taken as bottoms from the separation column. The overhead stream comprises the high purity isopropyl alcohol having a metals

content of less than about 1 ppb and a water content of less than about 100 ppm.

Kagiyama discloses a process for purifying a **waste organic solvent**, such as IPA, used in semiconductor manufacturing. The waste organic solvent to be purified is an organic solvent containing water, an acid, other electrolytes and particles. The water content is in the range of 10 to 40% by weight. The process to purify the waste organic solvent is a **two-stage process** that includes pervaporation and distillation.

Marker discloses a continuous distillation and membrane separation process. In one embodiment, the stream to be separated is a mixture of IPA and water, typically from an IPA production process where the **water is present, for example, in an amount about 82 mass%.** The process uses a single vessel having both distillation and membrane separation capabilities.

Adams discloses a method for the on-site reprocessing of **waste IPA** generated in semiconductor manufacturing to an ultradry and ultrapure level. The method includes the use of a pervaporation step followed by double distillation.

It is respectfully submitted that contrary to the Action's contention, a prima facie case of obviousness has not been established. To establish a prima facie case of obviousness, three requirements must be satisfied. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Second, the proposed modification of the prior art must be viewed from the vantage point of the skilled artisan at the time the invention was made. *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209, 18 U.S.P.Q.2d 1016, 1023 (Fed. Cir. 1991). Lastly, the prior art reference must teach or suggest all of the limitations of the claims. *In re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).

It is respectfully submitted that the cited references, taken either alone or in combination, fail to teach or suggest all of the limitations recited in claim 1. The process of the claimed invention requires a feed stream having at least 99.9 wt.% IPA. To the contrary, the processes disclosed in the cited references are all for the purification of a feed stream of waste IPA having far less than 99.9 wt.% IPA. As set forth in Kagiyama, the water content in the waste organic solvent (IPA) is in the range of 10 to 40 wt.%, thus the IPA concentration can be no more than 90 wt.% (col. 4, lines 25-27). Even after purification by the inventive process of Kagiyama, the purified IPA has a concentration of 99.7 wt.%, which is not only less pure than the resulting purified IPA of the present invention, which has less than 100 ppm water present, but is also not as pure as the IPA feed stream of the claimed invention. Moreover, the purified IPA distillate of Kagiyama has 0.02 ppm of Na ions, 0.003 ppm of K ions, 0.003 ppm of Fe ions and 0.001 ppm of Cu ions. This is contrary to the high purity IPA produced by the claimed process of the present invention, which has a metals content of less than 1 ppb. As set forth in the present specification, there is a demand for ultrapure IPA, as in the present invention, for use in the semiconductor manufacturing industry.

In addition, the process in Kagiyama clearly does not disclose or suggest removing high purity IPA at a point either below where the feed stream enters the separation column, but above the bottoms stream, or at a point above where the feed stream enters the separation column but below the overhead stream, as recited in claim 1. As clearly set forth in the specification, by carefully removing the IPA from the separation column at one of these points, a high purity IPA is produced. To the contrary, the distillation process disclosed in Kagiyama does not remove the IPA from a point between the overhead stream and above the bottoms stream. The IPA in Kagiyama is removed from an overhead stream line.

Like Kagiyama, Marker fails to disclose or suggest a process by which the feed stream to be purified has at least about 99.9 wt.% IPA, as recited in claim 1. To the contrary, the stream to be purified in Marker is about 82 mass % water and only 18 mass % IPA. In addition, Marker also fails to disclose or suggest a process in which the high purity IPA is removed from a point

between the overhead stream and the bottoms stream in the separation column. As pointed out above, selecting the proper point of discharge is critical to producing high purity IPA having less than 100 ppm water and less than 1 ppb metals, as in the claimed invention.

It is respectfully submitted that Adams fails to cure the deficiencies in both Kagiyama and Marker, in that it also fails to disclose or suggest a process for producing high purity IPA by feeding a feed stream having at least about 99.9 wt.% IPA into a separation column, and removing high purity IPA from a point in the separation column between the overhead stream and the bottoms stream to produce an IPA with less than 100 ppm water and less than 1 ppb metals content, as recited in claim 1. To the contrary, Adams produces ultradry and ultrapure IPA with a series of pervaporation and distillation steps, none of which remove high purity IPA from a point in the separation column below the overhead stream and above the bottoms stream, as recited in claim 1. To the contrary, the ultrapure and ultradry IPA produced by Adams is removed from the overhead stream in both distillation columns used.

Therefore, the cited references, taken either alone or in combination, fail to disclose or suggest each and every limitation recited in claim 1. As such, claim 1, as well as claims 2 through 10 which depend either directly or indirectly from claim 1, are patentably distinguishable over the cited references.

It is also respectfully submitted that the cited references, taken either alone or in combination, fail to disclose or suggest all of the limitations recited in claim 11. Claim 11 also recites a process for producing high purity IPA requiring feeding a feed stream comprising at least 99.9 wt.% IPA in a separation column, like claim 1. As stated above, clearly none of the cited references disclose or suggest a process with such a feed stream. To the contrary, the feed streams in the cited patents are laden with 10% or more water, as the streams to be treated are waste streams from semiconductor processing. Moreover, none of the cited references disclose or suggest a process for producing a high purity IPA having a metals content less than 1 ppb and a water content less than about 100 ppm in a process that employs a single separation column, as

recited in claim 11. To the contrary, the process in each cited reference requires multiple purification process, such as, a pervaporation and a distillation process (Kagiyama), a distillation, membrane separation and second distillation process (Marker), and a pervaporation and double distillation process (Adams), unlike the claimed invention.

Therefore, the cited references, taken either alone or in combination, fail to disclose or suggest each and every limitation recited in claim 11. As such, claim 11, as well as claims 12 through 20 which depend either directly or indirectly from claim 11, are patentably distinguishable over the cited references.

In summary, it is submitted that the pending claims are clearly patentable over the cited references. It is respectfully submitted that the claims avoid the rejections set forth in the Office Action, and thus place the claims in condition for allowance. Reconsideration and withdrawal of all rejections of the claims are respectfully requested.

Date: September 16, 2002

Louis N. Moreno

Louis N. Moreno
Registration No. 44,953

Post Office Address (to which correspondence is to be sent):
ExxonMobil Chemical Company
Law Technology
P. O. Box 2149
Baytown, Texas 77522-2149
281/834-5675
Fax: 281-834-2911

APPENDIX

Marked-Up Copies of the Amended Claims

IN THE CLAIMS

Claim 1 is amended as follows:

1. (Once Amended) A process for producing high purity isopropyl alcohol comprising the steps of:

(a) feeding a feed stream comprising at least [about] 99.9 wt.% isopropyl alcohol into a separation column;

(b) separating said isopropyl alcohol into an overhead stream taken overhead from said separation column and a bottoms stream taken as bottoms from said separation column, wherein any isopropyl alcohol in said overhead stream and said bottoms stream is not high purity isopropyl alcohol; and

(c) removing said high purity isopropyl alcohol at a point:

(i) below where said feed stream enters said separation column but above said bottoms stream, or

(ii) above where said feed stream enters said separation column but below said overhead stream,

wherein said high purity isopropyl alcohol has a metals content of less than about 1 ppb and a water content of less than about 100 ppm.

Claim 10 is amended as follows:

10. (Once Amended) The process of claim 1, wherein said at least [about] 99.9 wt.% isopropyl alcohol is produced by a method comprising the step of distilling an isopropyl alcohol solution that contains no more than about 14 wt.% water using a ternary azeotrope.

Claim 11 is amended as follows:

11. (Once Amended) A process for producing a high purity isopropyl alcohol comprising the steps of:

(a) feeding a feed stream comprising at least [about] 99.9 wt.% isopropyl alcohol into a separation column; and

(b) separating said isopropyl alcohol into an overhead stream taken overhead from said separation column and a bottoms stream taken as bottoms from said separation column, wherein said overhead stream comprises said high purity isopropyl alcohol having a metals content of less than about 1 ppb and a water content of less than about 100 ppm.

Claim 20 is amended as follows:

20. (Once Amended) The process of claim 11, wherein said at least [about] 99.9 wt.% isopropyl alcohol is produced by a method comprising the step of distilling an isopropyl alcohol solution that contains no more than about 14 wt.% water using a ternary azeotrope.